

Theoretical characteristics of 1.55 μm InN based quantum dot laser

Abstract

The theoretical characteristics of photon emission at 1.55 μm wavelength are presented considering single layer of indium nitride (InN) quantum dots in the active region. The transparency threshold has been obtained at photon energy of 0.8016 eV and at zero normalized applied transition energy, respectively. The modal gain of about 12.5 cm^{-1} is obtained at the threshold current density of 51 Acm^{-2} . The external differential quantum efficiency of 65% has been achieved for the cavity length of 640 μm . The proposed structure with acceptable enhanced results will create a way to fabricate InN based quantum dot laser.

Keywords

Differential quantum efficiency; InN; Modal gain; Normalized surface density; Quantum dot; Transparency threshold